THE OPTICAL

MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notices.

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Important Notice!!!

WE have much pleasure in informing our numerous readers that on **Monday, the 9th inst.,** we intend removing our offices to

9, CARTHUSIAN STREET, E.C.
(Close to Aldersgate Street Station).

This step has been rendered necessary by reason of the want of sufficient accommodation at our old premises, which accommodation was insufficient to meet the growing wants (present and contemplated) of this journal.

All **EDITORIAL** communications should be addressed—

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Notes.

MR. JAMES MARKS has been appointed the advertisement agent of this journal for LEEDS and districts. His address is Hunslet, Leeds; and 11, Marlborough Gardens, Leeds. All communications sent to Mr. Marks will receive his prompt attention.

* * *

IN a natural gas well recently drilled in West Virginia the gas is produced at a pressure of 300 pounds.

* * *

ABOUT three weeks ago, when the curate was exhibiting some slides at St. John's, Derby, a slight explosion occurred and a panic ensued, but there were no injuries.

The X rays have created universal interest, and further developments are from time to time announced. One of the latest developments, which, however, yet requires confirmation, is that the Cryptoscope has been invented, whereby one can, under certain conditions see through certain objects. In connection with the X rays, the necessary apparatus is at present somewhat complex, but as they get better understood, doubtless matters will be simplified, and the principle of what is termed clairvoyance may also be made clear to the multitude. It evidently takes a long time to popularise a subject, as it is now about seventeen years since experiments in connection with what is called X rays were first commented upon by Professor Crooke.

* * *

The *Sheffield Independent* prints the following:—"What in the name of all that's wonderful is the Sheffield Optical Lantern Society? Are its members in the habit of parading with lanterns pendant from forked tree branches, like searchers in a play? I was tempted to ask these questions, but before I exposed my ignorance a friend reminded me that it is a modest little society, which throws much quiet, unobtrusive, intellectual light into dark places. Its president is Dr. Manton, and its list of patrons is headed by the Duke of Norfolk." The above society held their annual conversazione on the 13th ulto. There was a large attendance, and it was a huge success.

* * *

The first—so to speak—practical use that the Röntgen rays have been put to occurred at St. Thomas's Hospital. The hand of a patient who had broken one of his fingers was photographed, and from the delineation thereof, the surgeons were enabled how best to proceed in order to set the bone.

* * *

Lantern slides of Africa are at present having a good innings.

* * *

The Alkali Union, which has hitherto controlled the world's output of chlorate of potash, has reduced the price about 40 per cent. in anticipation of Bluemberg's new process for its manufacture, by which it is proposed to utilise the power of the Niagara Falls to produce electric current which will act direct on tanks of potassium chloride.

* * *

The firm hitherto known as Leonard Chapman & Co., of 4, Sheffield Street, W.C., will in future be known as the Central Compressed Gas Works, Limited. Some extensive alterations have recently been carried into effect, thus making these gas compressing works one of the most perfect in existence.

——:o:——

Black Light.—No. I.

By M. G. Le Bon.

(*Comptes Rendus de l'Academie des Sciences*).

The recent publication of photographic experiments with light of cathodic origin leads me to describe some of my researches (incomplete as they are), made during the last two years, regarding photography through substances opaque to ordinary light.

The following experiments demonstrate that ordinary light, or at least some of its radiations, pass through the most opaque substances without difficulty. Opacity is a phenomenon existing only for an eye like ours. Constructed somewhat differently it could easily see through walls. Let us place in an ordinary photographic printing frame a sensitive plate, and above it any photographic negative. Then above the negative, in close contact with it, an iron plate completely covering the front side of the frame. Expose the glass thus masked by the metal plate to the light of a petroleum lamp for about three hours. Strong and greatly prolonged development of the sensitive plate, continued to perfect blackness, will give an image of the negative, very pale but very distinct by transparency.

It suffices to slightly modify the preceding experiment to obtain images almost as marked as though no obstacle had been placed between the light and sensitive plate. Without changing anything in the preceding arrangement, place behind the sensitive plate a sheet of lead, of any thickness, and press down the edges so as to make them slightly cover the sides of the iron plate. The sensitized glass and negative are thus shut in a kind of metal box, the fore part being formed by the iron plate, the back and sides by the lead. After three hours exposure to petroleum light, as before, we obtain after development a strong image.

What is the role of the lead plate in this second experiment? Provisionally, I suppose that contact of the two foreign metals would engender very slight thermo-electric currents, the action of which would be added to that of the luminous radiations passed through the iron plate.

I hope shortly to be able to determine the role of the various factors which may be brought into play to give the preceding effects, and also determine the properties of light after passage through opaque bodies. The action which heat might exert, or that of the light stored on the negatives, has already been completely eliminated in my experiments.

Solar light gives the same results as that of petroleum, but does not seem to act much more actively. Cardboard and metals (iron, and particularly copper) are easily crossed by light. This passage of light through the most opaque substances is only a question of time.

If the above experiments are repeated in the photographic camera—that is to say, if a metal plate is placed before the sensitive glass (consequently, between this last and the object to be photographed), after two hours in the sun, an intense blackening of the glass is obtained in development, which demonstrates the passage of light through the opaque plate; but images are very rarely produced, and in circumstances which as yet I have been unable to determine. I have called the radiations of unknown nature, which thus cross opaque bodies, by the name of black light, on account of their invisibility to the eye. Considering the variations in the number of vibrations causing the different forms of energy, such as electricity and light, we may suppose that there are intermediary numbers corresponding to natural forces yet unknown. These last must be related by insensible transitions to known forces. The possible forms of energy, though very few are yet known, must be infinite. The black light, perhaps, represents one of those forces as yet unknown.

——:o:——

Oxygen, Its Manufacture, Storage, and Use.

By Edmund H. Wilkie

(Of the Late Royal Polytechnic Institution).

Although the convenience attending the use of compressed oxygen gas in cylinders has for the present put all other forms of gas containers into the background, yet there are many exhibitors who are so situated that the trouble and expense of obtaining the gas reduces them to the necessity of making it for themselves. We frequently find this to be the case by the letters received from various parts of the Colonies by our esteemed editor, and which appear in the columns of this journal, and it is to those and other similarly situated that these papers are particularly addressed.

The relative merits of gas-bags and cylinders have formed the subject of many articles in this journal, and the arguments on both sides are so many and so important that we can come to no other conclusion than that every exhibitor had best consult his own convenience, and consider the circumstances governing his own particular case. It cannot be denied, however, that the lanternist who makes his own oxygen stands in a much more independent position, and there is a feeling of security in the fact of being able to produce any requisite quantity of gas at will, and during the actual exhibition the operator is likely to feel more comfortable and confident if he can just run his eye over his apparatus and see at a glance how long his gas is likely to last. In working such subjects as "Natural Phenomena" for instance, when almost every picture has one or more effects, the writer has never been able to obtain quite the same smoothness of dissolving with cylinders as with gas-bags, especially if there is much sudden turning up of one lantern to three, but these considerations we will not enter upon here, as our province is not to discuss the rival merits of various systems, but to describe what has been done in the past, and consider how best to apply the knowledge thus gained to the present.

Although the lantern operator may, under adverse and unfortunate circumstances, find himself short of oxygen gas, yet it must be very soothing to his feelings to know that practically he is surrounded by it, the world is full of it, and that no other gas exists in so great a profusion.

It enters into the composition of the mass of our earth to the enormous extent of one-third; one-third of the weight of our earth consists of oxygen alone. It is a necessary of life; we could not exist without it, and if our operator is not skilled in chemical matters it may interest him to know that during an exhibition lasting ninety minutes, in the course of which his lantern has to be fed with, say, twelve feet of oxygen, an audience of 1,000 persons will consume no less a quantity than 42,000 feet. An eminent medical man informed the writer that since the introduction of cylinder gas as an ordinary article of commerce the profession have used it largely in the treatment of bronchial affections, the method being to suspend a large funnel, mouth downwards, a short distance above the face of the patient, while the narrow end is connected by means of a flexible tube with the cylinder containing the gas. This being arranged, a very small stream of oxygen is allowed to escape, which mixes with the atmospheric air in the funnel, and is inhaled by the sufferer. About half an hour of this treatment is found to afford the greatest possible amount of relief to the lungs, and stimulates the whole system.

Most of the methods of obtaining oxygen are well known to all lanternists, but just for the benefit of those who have neither the time nor opportunity to go very deeply into the matters, we will venture to mention a few of the best known, even at the risk of boring those who have it all at their fingers' ends. Some years ago the present writer came across a receipt for manufacturing oxygen by putting certain proportions of permanganate of potash and peroxide of barium in a Woolff's bottle, and adding a little water, when the gas would commence to generate. This seemed just the right thing, and rosy visions at once began to float through our minds of large bags of oxygen made by tipping a sort of seidlitz powder into a bottle and leaving it to its own devices. But it was altogether too good to be true. A visit to Griffin's, in Long Acre, supplied us with chemicals of the very best quality (we forget the exact quantities) to the value of 1s. 5d., these being placed in the bottle (a 12-foot bag having been previously connected to be ready for the rush of gas), we sat down to watch the process. All was calm—not a ripple disturbed the surface of the water; but presently a bubble rose to the surface, gradually enlarged, and finally burst. This was followed by another at a short interval, and so it went on. It was a failure, and we gave it up once and for all. We, most of us, know that by decomposing water by passing an electric current through it, we can obtain both oxygen and hydrogen, but not in equal volumes. If we take a quantity of water, and divide it into nine parts, the oxygen would be represented by the immense proportion of eight parts out of the nine, so you see that if by any means we could get rid of this one part of hydrogen, all the rest would be pure oxygen.

Let us go into chemistry for a moment, and see where that leads us. Our object being to get rid of the hydrogen, we must search for an agent which, under certain circumstances, has a greater affinity for hydrogen than it has for oxygen. This we find in the gas chlorine, and the method of using it in making oxygen from water will be easily understood with the aid of Fig. I.

(A) is a flask containing manganic di-oxide, thoroughly wetted with strong commercial hydrochloride acid, the mouth being fitted with a cork, holding a bent glass tube, reaching almost to the bottom of (B), which is a similar flask, containing water, from the mouth of (B), another tube is connected with (C), which is a porcelain tube running through the furnace (D). A little gas furnace will do—anything that will give sufficient heat to keep the tube (C) red hot. Under both the flasks are small Bunsen's burners, and the mode of action is this:—By the action of heat, chlorine gas is generated in (A), which passes along and mixes with the steam in (B). In the red hot tube, the chlorine and hydrogen chemically combine, forming a third product—hydrochloric acid, which is absorbed in the water in the wash-bottle, leaving the oxygen free from its shackles to go on its way rejoicing. We learn one thing in making these experiments, which may be of use to us in treating oxygen and chlorine under different circumstances, we find that chlorine is absorbed in water very readily to the extent of two or three times its own volume, when the water in the wash-bottle or purifier is *cold*, but is not absorbed in *hot* water. Therefore, when making oxygen from chlorate of potash the water in the purifier should always be kept as cold as possible, and be sure to have as large a purifier as the circumstances of the case will admit. Many lanternists when making their own gas put the old limes into the purifier, as it is a well-known fact that chlorine has an affinity for lime in a measure, but a lump of ice would serve the purpose better and cool the gas at the same time. The ordinary method of making oxygen which is known to every lanternist, consists in heating in a suitable vessel chlorate of potash mixed with some substance which serves to retard the process of melting, usually by the purely mechanical method of separating the crystals of potash. The substance most frequently used is oxide of manganese either in grains or powder, and

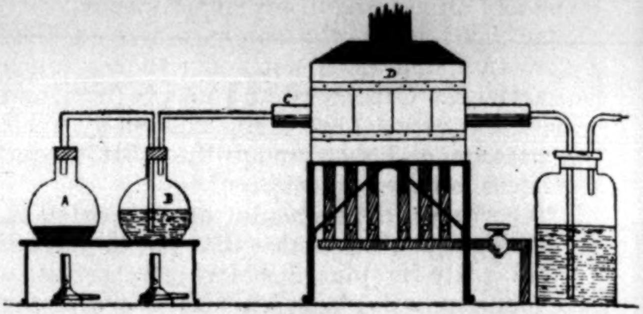

Fig. I.

although many other things have been suggested, such as salt and sand, yet the good old-fashioned method wears the best, and is always used by the writer.

Now what is a suitable vessel in which to make the gas? Our requirements are, roughly speaking, plenty of heating surface, a free outlet, together with moderate size and weight.

It would be futile to contend that the operation of making oxygen from chlorate of potash is without danger, but with ordinary care there should be no more risk than in going a railway journey, or eating mushrooms. Let us think for a moment and consider where the danger lies, and we shall undoubtedly come to the conclusion that, given pure chemicals, we ought not to meet with any hitch, if the gas has a free passage, so that, this is the principal point to which our attention must be directed. When the chlorate of potash reaches a certain temperature it liquifies, and enters a state of ebullition, or boiling, after which it settles down into a hard mass just like the streams of lava from a volcano.

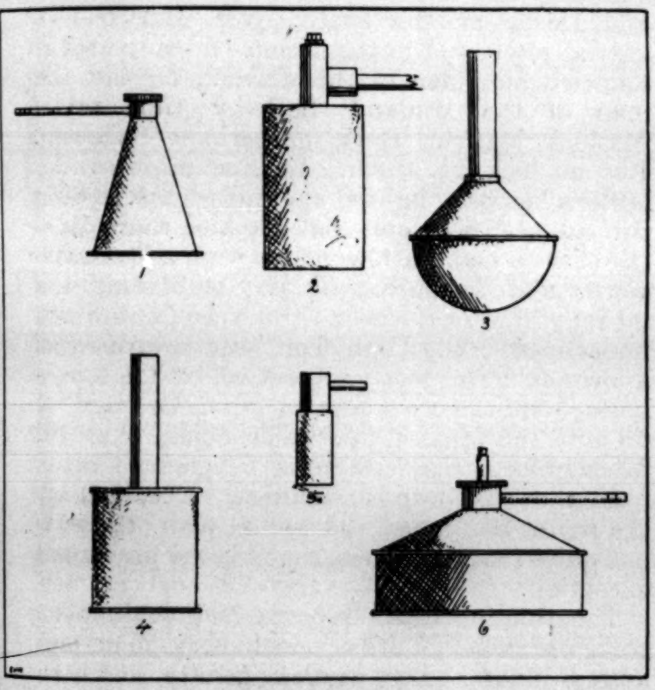

Fig. II.

Should this molten substance by any means enter the exit tube of the retort, and cool there nothing could prevent a violent explosion taking place, if the retort is not provided with a second outlet. Almost every lanternist has his own particular fancy in the matter of pattern, and in Fig. II. we have a few of the forms mostly to be met with. No. 1 is the ordinary commercial retort made of sheet iron or copper, and having a flat screw-cap which can be removed for the introduction of chemicals. Such retorts have been in use for many years, and have at least one very good point; they stand firmly on any flat surface, but frequently the outlet tube is smaller than is desirable, and owing to the tendency of rolled iron to shell when heated, soon wear out. No. 6 is similar, but has a greater heating surface, and being provided with a safety tube fitted with a cork is more manageable in case of a rush of gas.

In No. 2 we find the mercury bottle, a form of retort which has many staunch supporters.

In the drawing we show a fairly good way of fitting the bottle as a retort, by screwing into the neck a large bore T piece, made of ordinary iron gas barrel. In the top portion is fitted a gas plug, which can be removed for filling the retort, and a length of gas barrel of large bore leads off at the side to the purifier. Fitted in this way they are in a degree satisfactory, being almost indestructible, but are heavy to use, and if by any chance the passage did become choked, why then !———

No. 3 is made of stout copper, with a gas barrel outlet at the top, very solid and very strong, but will not stand on its own base. No. 4, however, shows a different pattern of the same make, which will stand flat, and owing to its shape occupies little room in packing. The chief novelty, however, lies in the head seen at No. 5. It is a tin cap and outlet tube, the cap being of the same external diameter as the gas barrel on retort; the two are connected by a short length of vulcanised rubber tube. This is a good arrangement, as in case the pressure in the retort becomes too great the cap simply jumps off with a slight pop; the congestion is relieved, and the cap can be replaced without much loss of gas.

The form of retort which the writer has found to present the most advantages is shown at Fig. III., and is the arrangement of Mr. B. J. Malden, F.R.G.S., whose admirable and entertaining lectures rendered him for many years so great a favourite at the late Royal Polytechnic Institution. To this gentleman the lantern world is indebted for many of the improvements and innovations which have raised first-class dioramic lectures to their present high position, and he was intimately connected with the evolution of the triple lantern, the modern gas dissolver, the particularly light and compact skeleton pressure boards, and many other matters of smaller moment, so that from him we are lead to expect something eminently practical and well suited to the work in hand, but I notice that my allotted space is becoming limited, so, following the example of the weekly serial story writers, just as they have arrived at an interesting point, take our leave for the present, merely remarking—To be continued in our next.

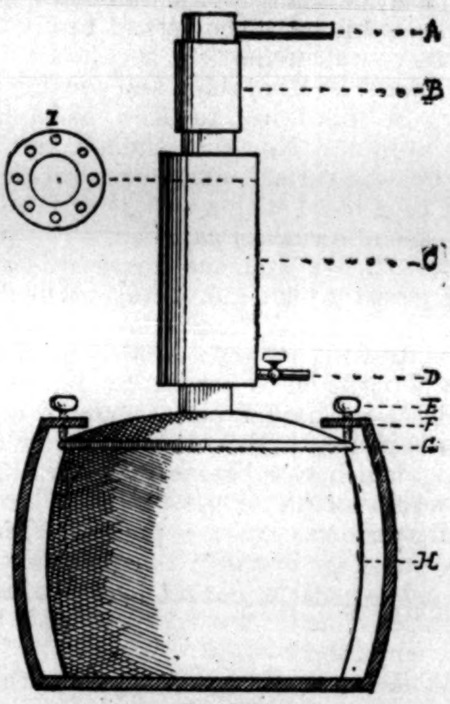

Fig. III.

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Slides Imaginative.

By a Hospital Patient.

"Now, Madeira," said my medical adviser, "will put you right. In addition to the climatic advantages for which it is noted, the short sea voyage will rid you of the town cobwebs, which undoubtedly is your chief ailment."

This was five years ago. I had been running down, so to speak, for a long time. Bottle after bottle of various concoctions did I swallow, but to no purpose. The medicine recommended above was the only hopeful one—a complete change.

But before deciding upon Madeira I consulted—as was my practice—the cases of lantern slides at command. There were several charming views of the isles, and the result was I went, and returning in a month, was the possessor of a bronzed complexion, good health, and fifty bits of artistic scenery, which afterwards were turned into lantern slides.

Whenever the readers of the Optical Magic Lantern Journal are thinking of taking, say, a summer holiday to a resort they have not previously visited, the above-mentioned plan will be found an admirable one, inasmuch as one can make notes upon visiting the chief sights of interest by merely looking through a set of slides. To make the meaning more clear, take an illustration: "Don't know where to go," you say, "then we'll take a look through your collection of pictures. 'The Channel Islands,' 70 slides, yes; I've been there," you say, "and brought many of these views home with me. 'America, as it was and as it is,' 72 slides; too far, and can't spare either time or money. 'The West country,' 64 slides; oh! yes, have done the west country twice. 'The Derbyshire Peak,' 56 slides. Have often been advised to visit this tract of country. Let me see, not far to go, and a few days can be spent at a nominal cost. Yes, will decide on the Peak." And after looking through the set, consider the boundary line to be Buxton on the north side and Derby on the south. We next seek a central pitch, and in the absence of a personal knowledge or plan of the district, consult the map of the Midland Railway time table. Matlock, Matlock Bath, or perhaps Bakewell. Let us look at them. In five minutes the lantern has been lighted up, and we are passing through scenes of our contemplated tour, pausing only to make a few notes, such as "Chatsworth and its surroundings," embracing the model village of Edensor—the word Chatsworth underlined, "the High Tor," the twelve rocks known as "The Twelve Apostles," "The Doveholes," and other caverns in Dovedale; and so on until the whole series has been gone through. Much information can thus be gleaned apart from the stereotyped readings. Excellent as the writer has found the above plan, the rule has quite recently given scope for the proverbial exception.

The running down process had again been going on some months, terminating in a prolonged illness. The medical faculty had been strained to its fullest tension, until one morning, a few short weeks ago, my doctor's face assumed its gravest aspect as he sat by the bedside and began with deliberation to inform me he had decided that a surgical operation was imperative ere I could arrive at the convalescent stage. "You must consider the advisability of going into hospital for a short time, for—as a reasonable man—you will understand the difficulty of turning a private house into an establishment of that kind. To-morrow morning when I call," he continued, "I hope to have your consent. Whatever you do don't get depressed, there is no danger, and you must trust me for knowing more of the disease than you can expect to know, and 'twill all be over in a few days."

Here was a pretty to do! The collection of lantern slides would not help me one jot. Depressed! Who would not get depressed? Hospital! The word was distasteful to every member of the family. There was no alternative, however; consent was given, and a few hours later I was made an in-patient of the London Hospital. There are four wards in the Talbot group, called respectively, Talbot, Gore, Prince of Wales, and Wellington, and they communicate one into the other. To the first named I was conducted, where there was but one vacant bed, and whilst that was being got ready for my reception, I was made comfortable beside a cheerful fire. There was time for a casual look round, and it must be at once confessed there was an entire absence of depression in the surroundings. A lantern slide in prospective is suggested, full of detail. Plants and flowers in each window. A centre table, bedecked in like fashion, was becoming; the fire place was bordered and medallioned with hand-painted flowers, so fresh and bright that they might have been done yesterday. Beds and bed-furniture looked as though only one mould had been used in producing them, and that only five minutes ago. A crease in one of the white sheets or a ruffle in any of the baize foot-rugs it was impossible to find.

Thirteen out of the fourteen beds were occupied by thirteen cheerful patients, who cracked harmless jokes across to each other, or discussed the latest sensation in the morning paper. To a man who had been used to the up-hill and down-dale sort of existence, here it could be seen at once was a new experience. It must be understood by the uninitiated in hospital matters, that patients, to a great extent, drop their identity on entering, and it is somewhat amusing to hear them addressing each other by the orthordox pseudonym, as nine, five or fourteen, as the case may be, for each is known by the number of his bed. This was soon made self-evident to the writer, for he had not been between the sheets many minutes when the following came from a fellow-comrade in misfortune: "Had much to do in the chloroform or ether line, number one?" asked number four. Not knowing to whom the question was addressed, I took no notice. "Number one," repeated four, in a higher tone, "Hi, you in the corner, know anything of chloroform or ether?" "Oh! I beg your pardon," I replied, at the same time looking behind me at my number plate, "I was not aware you was speaking to me. Chloroform? well, no, that's a fluid I've had little or nothing to do with; and ether," I continued, "well, I'm aware it's a highly inflammable liquid, but the only experience I've had with it has been for lantern work with the saturator, and I certainly like it better than benzole." "Saturator," said four, "what's that?" "Don't yer know?" broke in seven, "that's the gutta percha bag thing they puts over yer mouth before yer go off." By the latter remark, the drift of four's enquiry was plain, and that he referred to chloroform and ether as the mediums used by the surgeons for inducing insensibility. I soon explained to my new friends that I could not speak from a personal knowledge of the effects on my constitution of either volatiles in point. "Well," said five, "if you're anything like two you'll laugh for a week afterwards, won't he, two?" "Yes," replied two, "and if you are anything like five, and noise goes for aught, you'll fancy you've got the World's Fair in your small inside; what say you, five?" "Thirteen was best," chimed in eleven, "for after laying in comparative ease an hour and a half, he finished by singing:—

"The minstrel boy to the war has gone,
Lumte-iddle diddle find him."

"Happy thirteen," thought I.

This vein of conversation went on for an hour, discussing each other's peculiarities on recovering from the effects of ether or chloroform. To some minds it might not all have been in good taste, but it was harmlessly meant, and my faith in medical science was too well established to regard such remarks seriously.

A few hours later it was, perhaps I should say, number one's turn to sniff the ether, and what followed is purely conjectural.

This article, however, is not written for the purpose of describing a patient's experience so much as to give an idea or two for a few slides that are not at present available, and which it is thought would prove attractive.

It was December 21st when the writer entered on the recovery path, and therefore was confidently booked an inmate for the Christmas festivities. What happened during the next few days will never fade from the memory. What would he not have given for the required strength, and the photographic where-with-all which would have enabled him to demonstrate more graphically what took place than pen can ever do.

At first the appetite was nulled with pain and suffering, and could not be brought to think of a Christmas Festival in hospital to be anything more than a grievous farce; but opinion was quickly changed from wretched farce to a splendid blessing, and many interesting pictures may be culled by the readers from a perusal of the following few lines.

There are many English villages, with fewer inhabitants than has the London hospital, and the geography of many a small provincial town would be mastered in quicker time than would that of this the largest institution of its kind in the United Kingdom, and possibly in the whole world. It contains just upon 800 beds, has a nursing staff, together with forty sisters, of 300, all of whom, say, with the exception of a couple of dozen, are in residence here. Of major operations the enormous figures of 1,800 were reached in 1895, to say nothing of the minors, or those of a less serious nature. The chapel, or the church, if you prefer it, is unique in its completeness; has seating accommodation for four to five hundred; claims as its own, a chaplain, a curate, a fully-fledged church organ, and surpliced choir; and to keep the whole thing going £1,000 a week has to be found. From the date above mentioned to Christmas Eve all were busy in decorations. Patients who were allowed to get up entered into the work with a right good will, while those you could but sit up in bed an hour or so, busied themselves in cutting out shields, mottoes, and monograms in bright and fancy coloured papers.

"God bless our nurses," read one, and to that benediction, Amen, was the prayer of each patient, for it is only the inmates of these places who can know what these good creatures do. On Christmas Eve we were gay with holly and mistletoe, the tester of each bedstead had its wreath of laurel and creeping ivy, while bunting, and flags of all nations were conspicuous everywhere. Bed number one, unlike the others, had its head at one end of the Talbot ward proper, so that the occupant could see through instead of across, which for many reasons made it more pleasant. At eight o'clock the gas was turned down, although the apartment was not so dark as usual, owing to the varied coloured fairy lamps that were studded about. The effect was a good one. Early next morning the strains of a band of carol singers could be heard in the far distance, and as time advanced the volume of sound got nearer and nearer, until it approached the entrance of our ward. By this time, though no movement came from any of the bed-clothes, all were awake and waiting to see—which we presently did, a procession of fifty carol singers, some carrying coloured lamps of the Jap form, some sprigs of holly, while all were exerting their full lung power in rendering the music associated with Christmas morning. Our good night nurse, "Talbot," stood aside to allow the processionists to pass, smiling at them with a satisfaction, as though she were saying, "sisters, on many past Christmas mornings have we done likewise, and helped to lay the Messiah in many a poor man's crib." That the scene was highly effective goes without saying, and to reproduce it on the screen at some future time is surely worth an effort; its good, too, upon suffering humanity, and cannot be too highly eulogized. But this was only a foretaste of what was to follow. Time was young, 5.30 a.m. The Talbots, and all wards throughout the hospital were kept busy the whole of the day, so earnest are they at the London.

A few minutes before the lights were turned up—which is done punctually at six—number one had his weather eye open, and could see nurse stealthily place beside each patient's bed an envelope, which contained her Christmas congratulations in the form of one of the season's cards.

There was much discussion during breakfast as to whether the singers we had heard were members of the "Santa Claus" family or not, whether the steaming hot sausage-rolls, the eggs and toast, and other luxuries that had mysteriously found a place in the morning menu, had lost their way, or had also emanated from a personage of the same confraternity. Be that as it may, they were welcomed, and no question asked as to whether they would agree with three's, five's, seven's, or nine's ailments or digestion. After prayers, came the postman, and with him budgets of news from loving friends, and many a dry eye was moistened when the thoughts reverted to home, or to reminiscences of past Christmastides, and many a hope expressed that the next of 1896 would find us in our accustomed places. Wellington Ward, being the largest in the group, was selected for the chief entertainment, and there a stage had been built with curtain, accessories, etc., all up to date. After lunch, or at 9.30, those who could walk were invited to Wellington to enjoy a programme of sacred music, including many well-known carols, and right merrily was it enjoyed.

These proceedings were barely over, before there was a general hubbub, holloaing, shouting, and cheering, till no doubt many thought themselves at school again, and it was Guy Fawkes' day. But no, it was not Guy

Fawkes' day. A picture was coming, prettier and fresher than that ever was. Father Christmas and his attendants had arrived, really alive and well, looking exactly as we know him to look in shop windows. There he was in his fur-trimmed coat, beard and all. But what immense pockets he's got, containing so much too, something for everyone, toys for the young, pipes, pouches, tobacco, silk handkerchiefs, and a host of things for those of older growth. What a noise they made too as they distributed their presents, and wishing one by one the season's greetings.

Who could possibly think of pain while excitement of such a nature was proceeding. Father Christmas had barely disappeared through the doorway, before the Kyrle Musical Society, numbering some twenty artistes, had taken their places in the lobby, and went through a programme of music which lasted up to dinner time.

Every five minutes some new subject for a picture presented itself. But we must hurry on, and pass over both dinner and tea, though it must be confessed these matters were not easily passed over.

The evening bill—as may be imagined—was the chief attraction. Patients who were unable to reach the Wellington Ward without assistance were taken in wheeled chairs, while if unable to leave their beds, were carried there bodily—bed, bedstead and all complete. The Hall of Entertainment presented a curious spectacle. The first five rows from the footlights were not stalls or lounges, upholstered in velvet for certain dignatories, but simply bedsteads, and the occupants ranged from boys of six or seven years of age to old men of sixty or seventy. Also invalid chairs and couches in variety down to the humble cane bottom or windsor.

Of the entertainment in particular, space forbids saying much. There was, however, something to suit the tastes of all, songs humorous and sentimental, glees, madrigals, instrumental solos and duets for pianoforte, violin and mandoline; readings, etc. The whole terminating with a screaming farce, arranged and performed by the medical students. There was nothing of the amateur element in any one item. Who the artistes were was not made known, but that they were ladies and gentlemen of great ability was an undeniable fact, and thoroughly earned the three cheers given them at the close. Oh then! three cheers were given to our doctors, and three cheers for our nurses; and then we were taken back to bed, and the lights lowered; but not to sleep just yet, for the strains of distant music could again be heard. We opened with a procession, and it was evident we were to close with one, for before we were aware of it, it was coming through the ward. Not carol singers this time—all white—but a troupe of forty or fifty niggers—all black. The troupe that had been sharing honours both afternoon and evening, with the two or three magic lanterns in the other parts of the building. Here they come—and here they go—playing and singing the ever popular "Old folks at home."

The sooner these scenes are presented to the people on the screen, the sooner will die any existing prejudice.

"Now number one, get to sleep." "Good-night nurse"; and as I dropped off, I came to the conclusion that there are many worse ways of spending Christmas than in a hospital.

——:o:——

Registering Discs: How to Make and Use Them.

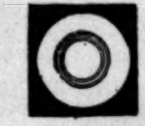
By A Lanternist.

Continued from page 34.

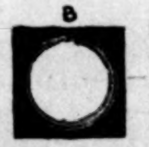
In drawing the point across see that the film is cut perfectly through so that it leaves bare glass. Now get two mats of a perfect circle or cushioned square, and exactly coinciding, spot the mat, and lay carefully on the prepared squared up slide, and find a suitable cover-glass; clean up and lay carefully on the top of mat, and then bind up. For binding purposes photophast will be found excellent.

We will now proceed to use them. I will here describe the usual method for getting a good light, taking for granted we are using the two cylinders H and O. After getting the bi-unial into position, with tubing and cylinders attached, clean the condensers and the lenses with a soft chamois or a washed-out silk handkerchief, which should be kept and used for no other purpose; replace the condensers carefully, and if found necessary warm them in front of a fire to dry up all moisture that may be present, now place the limes on the jets, starting with the lime at the top, see that all the taps are off except the hydrogen bye-pass of dissolver, as the oxygen one can be turned right off when using a mixed jet, and I advise turning this off so that the arm or lever is turned inwards towards the dissolver plug, as it is much less likely to be touched by the fingers when the dissolver main arm is in use. Having turned on the gas at the cylinders, then H tap of bottom jet, light up and proceed to do the same with the top jet; we have now the gas burning in top and bottom, and by turning the dissolver down the bottom jet will most likely flare up, regulate this and see if the bye-pass of H on dissolver is just sufficiently on to allow a slight leak, about ½ in. of flame, in top lanterns. Having thoroughly warmed the limes turn H taps on full, gradually turn the O taps into the flame, until just short of hissing and it may be necesary to gradually lower H taps, the light should now be adjusted and fixed precisely in the exact centre of the optical combinations, and the tray pushed in or pulled out the correct distance from the condensers, otherwise one part of the screen will be darkened, and this can only be arrived at by trial, and to the inexperienced is somewhat a test of patience.

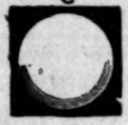
A



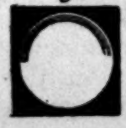
B



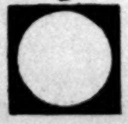
C



D



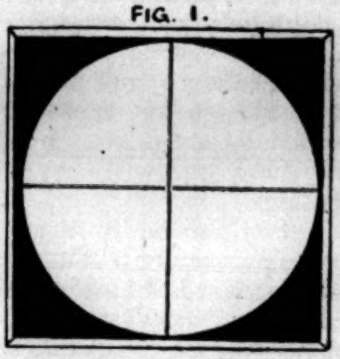
E



The rough sketches illustrating the centering of light, speak for themselves. In A the jet is too close to the condenser: B, jet too far off; C, jet too low down on the rod of tray; L, jet not low enough on the rod; and E, the disc when perfectly illuminated. With these the operator should find it much less difficult in determining the true position of jet. Take the two discs spoken of and place them in an inverted position in the carriers, the spots or plain cover glass being next the condenser, and then tilt the lantern by means of the tilting board on top of box, and we find that the position of discs is similar to the sketch, Fig. I. Now push the carriers so that the two vertical lines coincide by drawing either one or other of the carriers in or out, taking the inner slide carrier to be right home. When this is arrived at, then proceed to lower the top by means of the milled head screws, and raise the bottom ones by the same means, till the horizontal lines coincide exactly on the sheet, and we have two distinct crosses, and two perfect circles or cushioned squares. Now take out the discs which have been focused up sharp, and insert two similar slides as far as mats go, and you will find that the true dissolving effect is completed, much more so than in the usual way of focusing up with two slides to start with.

The great charm of seeing one view dissolve in another is thus satisfactory, without that dropping or raising into one another where registration is not looked after.

FIG. I.



To use same for a triple lantern proceed exactly in the same way, get the middle first, then the bottom, then turn off bottom and get the top to coincide with middle, and when the three are once coincident, the milled head screws should not be again touched. It may possibly with some lanterns be necessary to adjust the jets again on the condenser, as we have moved the optical centres by raising the top and bottom lanterns, but with my own the whole is done at once, the lenses, condensers, and jets being on one stage complete, the whole if moved after being once set is always on an equal centre. If these directions are carefully carried out, the registration of the lanterns becomes "as one," and the two cross discs being placed in the lanterns you can quickly get the register value true on the sheet, I believe, as quickly as by the most elaborate means that have been brought out.

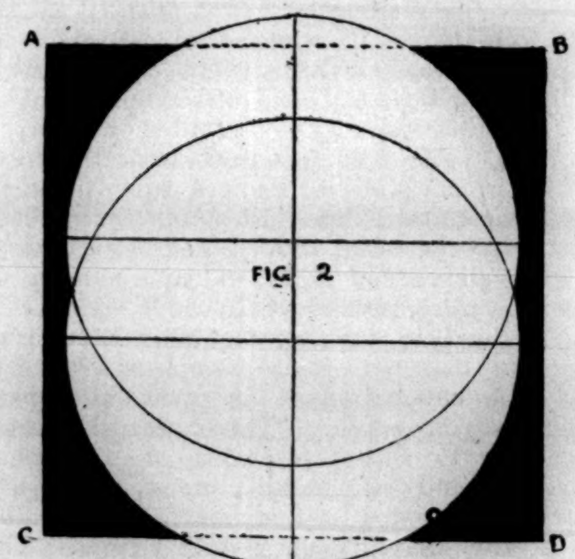


FIG 2

Reference to Fig. I. shows the disc registering slide, made in a circle, the white portion there shown would be the coloured in the slide, and the lines across would be the pen-knife cuts on the films, showing bare glass. Fig. II. shows the two discs being registered on the sheet

ABCD, with the vertical lines coinciding, before dropping and raising the lanterns. The other five sketches no doubt the amateur or novice will find useful in adjusting the limelight for the first time or two, and having once grasped the idea there should be no more difficulty as to how to register or regulate the light.

——:o:——

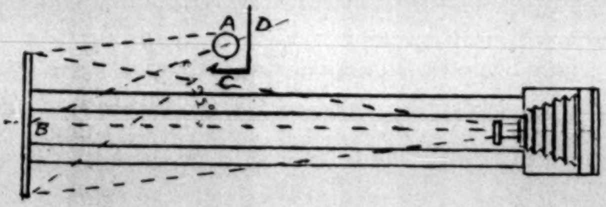
Production of Negatives by Gaslight.

By W. J. Coles, A.M.I.C.E.

An easy method of obtaining negatives independently of daylight will, no doubt, be welcome to those who wish to reproduce engravings, prints, etc., for lantern slides during the winter months.

I have for some time employed the following method with good results:—

The source of illumination for engravings up to about 12 inches square is a Welsbach incandescent light (A), which is placed at one side of the bed on which the camera slides, in such a position that the angle between the centre lines of the camera and the light is about 25 degrees (as shown). This is specially necessary when the original has a glossy surface, for if placed at a much less angle the rays of light will be reflected into the camera and cause a blurred negative. The distance from light to centre of screen (B), against which the engraving is fastened, is 18 inches. (C) is an opaque screen to prevent direct rays of light from falling upon the lens, but care must be taken that this screen does not cut off any of the rays from the light to the picture, or from the picture to the lens. (D) is a flat reflector; the bottom of a large porcelain developing dish answers well.



PLAN

SCALE 3/4 = 1 FOOT

For larger engravings two lights are necessary, one on either side, placed at 22 inches from centre of screen, and the angle increased from 25 to 30 degrees. A lens of 5 or 6 inches focus is most suitable, and a burner with a bye-pass is a convenience.

So much for the apparatus, which, as will be seen, is very simple.

The proper exposure, with stop f. 22, is for Ilford ordinary about 2 minutes, and for Ilford isochromatic, without the yellow screen, 1½ minutes. These plates give far better results than the former, except when the original is a monochrome inclining to red or yellow, when ordinary plates should be used in order to get greater contrast in the negative. When making negatives from coloured pictures a yellow screen should be used behind the lens to obtain the best results. The negatives produced in the manner indicated are strong and very suitable for the production of lantern slides.

Objects in relief do not yield so satisfactory results on account of the shadow, but if the relief is only slight there is no perceptible shadow.

As the light falls at an angle upon the picture to be photographed, one side of it is not so brightly illumined as the other, therefore one side of the negative is rather thinner than the other. With some subjects, or with narrow originals, this is not noticeable. In any case, this can be corrected when printing by contact by holding the frame at an equivalent angle to the light, so that the weaker side of the negative is further from the light while printing.

——:o:——

Which is the Best Process for Making Lantern Slides?

By Duncan Moore.

Till a comparatively recent date the wet collodion process was considered unapproachable for lantern slides, and even now, where slides are manufactured in large quantities for the wholesale trade, wet collodion is almost universally adopted. However, the time will probably come when the newer gelatine plates will be substituted for it. There is much to be said in favour of wet collodion for this work when the demand is considerable. Wet collodion provides a transparency clear and thin, brilliant and full of detail, with very little trouble, comparatively, as to the matter of expense which necessarily has considerable influence when large quantities have to be dealt with it is undoubtedly the cheapest process, especially now that silver has become so depreciated in value. We can hardly take the ordinary commercial lantern plate as a specimen of what wet collodion can produce in the matter of quality, as the best samples of commercial work are much inferior to specially prepared ones in the quality of richness.

The wet collodion image can be very much varied in this respect by modification of the developer, much more than a gelatine plate can, as the image is formed by the deposition of reduced silver, and the developer that will reduce the metal to the finest possible state of division will produce the best quality of slide. On the contrary in a gelatine plate the silver exists in a state of chloride or bromide, and the function of the developer is not to deposit fresh silver, but to change these haloids into a metallic state, the consequence is, the fineness of the deposit is more or less dependant on the haloids in the plate than on the developer. We know a very rapid bromide plate produces a somewhat coarse image, whilst a slow chloride one has the particles of silver salt in an extremely fine state of division; this being so, lantern plates are usually chloride ones. At the same time there is no doubt the kind of developer influences the quality of the image in gelatine films by modifying the arrangement of the particles of the silver salts into large or smaller collections; as a proof of this we can compare a plate developed with ferrous oxalate with one developed by pyro-soda, although both may appear excellent as transparencies there will be a decidedly better quality of image on the screen from the pyro-soda developed slide than from the ferrous oxalate one.

If the plate itself was the only factor in the result, both should be alike in this particular respect, but as they are not we are driven to the conclusion that development has some influence in this matter, but very much less than it has on the wet collodion image, which is almost entirely under the control of the developer. Were it not for the colour, a pyrogallic acid developed wet plate would produce a deposit of silver so fine that it is scarcely like a deposit, more of the nature of a stain. Unfortunately for this process a slide must possess a pleasant colour in addition to other good qualities, and the pyrogallic acid colour is a purplish inky tint, not pleasant to look upon in large masses as revealed on the screen. It has been found that a weak iron developer, strongly acid and combined with albumen, will produce an image on wet collodion of exceptionally fine quality, and also of a pleasant warm colour very suitable for lantern slides. At one time glycocine was added in small quantities to the developer with particularly happy results, it had the effect of slowing the development but not the exposure, with the result that the silver by slow deposition was in an extremely fine state of division, and the quality of the image much improved. The clearness of the shadows, perhaps as much as anything, has tended to keep wet collodion in the foreground for this class of photography; for rapidity of production it is superior to gelatine. Once the apparatus fixed for copying, a camera is almost a necessity with wet-films; a slide can be exposed, developed, fixed and finished in ten minutes, possibly in less when in the regular swing of work, and a number are dried on the stove together. There is no waiting with wet collodion, they are developed in a minute or two and fixed in as short a time, a good swill under the tap and the washing is complete, and they can be quickly dried by artificial heat.

With a gelatine plate the development and drying are both rather tedious processes, the drying especially, unless submitted to a previous soaking in spirit of wine to abstract the greater part of the water, but except in cases of emergency the plates are left to dry spontaneously. Of course, rapidity of production has to be considered when large numbers are required, but, for private consumption, so to say, this is not important; it is more a question of which process will produce the best slide regardless of trouble or expense, which when only a few slides are wanted are negligable quantities. We have said what excellent qualities the best wet collodion slides possess, but undoubtedly to make them entails a great deal of mess that the majority of amateur photographers would not willingly incur.

Good modern gelatine lantern plates are not to be despised, and most beautiful work may be done with them; the chief difficulty, that of clear shadows, is now almost non-existent if the different manipulations are carried out properly. Perhaps the very finest results possible in this direction are obtained by an almost, if not quite, obsolete process—that of the collodio-albumen; the delicacy, richness and charming colours obtainable by this method are beyond all praise, but, unfortunately, it is a difficult and elaborate process, requiring considerable experience to ensure success, and therefore not easily available. Albumen in some form or another seems to conduce to the best results in transparency work, whether used alone in combination with collodion or in the developer.

Another process, that of the collodio-bromide dry plate process, is by many considered to lead the van for the production of transparencies; it is somewhat slow, but easily worked, and the results are exceedingly satisfactory. At the present time several well-known amateurs adopt this plan in preference to all others; its speciality is a remarkable clearness and delicay of image, and susceptible of giving pleasant colours. Like all collodion surfaces care is required in handling. The plates are easily prepared, and can be used either wet or dry without any apparent difference in the resulting image. Those who like to prepare their own plates I would strongly recommend to give this process a trial; I feel sure their trouble would be amply rewarded.

The different processes enumerated are undoubtedly the best for lantern slides, but, given a clean working plate of any kind not specially intended for this work, judicious exposure and development will produce a good slide.

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Some Properties of the Röntgen Rays.

By M. J. Perrin

(Comptes Rendus de l' Académie des Sciences).

I must admit, firstly, that I have only vague ideas regarding the discovery by Professor Röntgen, obtained from the daily papers, and as yet I am ignorant of the exact nature of these experiments.

However it may be, the following are the experiments I made:—

Firstly, I repeated that which constitutes the discovery; if in presence of a Crooke's tube in activity we place a closed photographic frame charged on which various objects are arranged, then if the plate be developed as usual, the silhouette of some of these objects appears; some emanation from the tube has thus imprinted the plate through interposed substances.

This is the Röntgen radiation. These rays are not cathodic rays; they could not, in fact, pass from a vacuum tube except through a membrane of some microns in thickness (*vide* experiments by Hertz and Lenard), whereas the Röntgen rays easily act from a tube the thickness of which is as much as 1 millimetre.

Secondly, I collected some observations about the degree of transparency of various substances. Wood, paper, wax paraffin, water are very transparent, the influence of the thickness being, however, distinct. Then by order of increasing opacity, are charcoal, bone, ivory, spar, glass, quartz (parallel or perpendicular to axis), rock-salt, sulphur, iron, steel, copper, brass, mercury, lead. These results are, however, not numerous, and I cannot unite them by a general law; however, we may now remark that metals generally are less transparent than other substances, but have not the absolute opacity which they present for light. If, for example, three plates of iron, about 0·2 millimetre thick be superposed, opacity only appears to exist in the part common to the three plates.

Thirdly: I then made a rather rude kind of experiment to ascertain whether radiation is quite definite, or if it merely forms a diffuse tuft; in a word, whether propagation is rectilinear. For this purpose I placed two diaphragms before the tube, which is opaque at some centimetres distance; on a sensitive plate placed a little further I obtained a well-marked spot with umbra and penumbra, and the dimensions of this spot are conformable with the hypothesis of rectilinear propagation. It is then possible to isolate definite pencils, and study their properties.

Fourthly: I endeavoured to reflect a definite pencil of Röntgen rays through two fissures of 0·5 millimetre at a distance of 4 centimetres. This pencil fell at 45° on a mirror of polished steel, from which, after reflection, it might have fallen on a frame plate. After an hour's exposure there was absolutely no impression. The experiment thus made with a metallic mirror was repeated with a flint plate as mirror. The exposure was continued for seven hours, absolutely nothing being obtained.

Fifthly: I endeavoured likewise to refract them. For this I placed in the lower half of the pencil defined by the system of fissure, firstly a prism of paraffin of 20°, then a wax prism of 90°. The two parts of the pencil should then give distinct images if there was refraction, in fact these two images are exactly prolonged, and we can say that if the deviation exists it is less than 1°.

Sixthly: Continuing to study what properties of the Röntgen rays could co-exist with their rectilinear propagation, I endeavoured to form fringes of diffraction.

The active part of the tube was placed before a very narrow fissure; 5 centimetres further was placed a fissure of 1 millimetre; finally, at 10 centimetres further, the frame charged and the exposure was nine hours. I obtained an image with very distinct borders on which no fringe was visible.

Exactly in the place of the preceding plate I placed a second sensitive plate, working now with open frame, so as to catch the green light emitted from tube, in some minutes this light gave a silhouette exactly like the first, but with fringes. If then the phenomenon is periodic, the period is much inferior to that of the green light employed.

It is well to remark that this experiment very strictly made demonstrates the rectilinear propagation of the Röntgen rays.

Topical Notes.

By The Dreamer.

The second jet competition at the Photographic Club was not a much greater success than the first, except that the present disagreement appears to be only between the first and second competitors, or rather the co-equals. A beat B twice, then B beat A, but A's gas was giving out. So the story runs.

By the time this is in print Parliament will have met, and we may hope soon to have the report of the Special Commission on gas cylinders published. Whatever is the result, and however favourable to the cylinders, the report will come too late to help the present lantern season, which has been none too flourishing. Why the matter should have dragged over so many months is one of those things "no fellah can understand."

The latest lantern for projecting scenes in which motion is seen is that of the well-known plate makers and chemists, A. and L. Lumiere. The apparatus—or Kineinatograph as it is called—is capable of use either for taking the photographs or projecting the positive pictures on the screen, and thus serves two purposes.

It is somewhat on the lines of the kinetescope and similar instruments, the pictures being taken at the rate of fifteen per second, and projected at the rate of ten a second, this being fast enough to give a continuous unbroken picture, owing to the persistence of vision. The film upon which the pictures are taken is about 50 feet long by an inch in width, and by means of the driving mechanism is caused to advance, stop for exposure, advance and stop for the next exposure, and so on.

It was lately my lot to attend a lantern entertainment at which the lecturer—if I may use the expression — was an inexperienced amateur. I say inexperienced from motives of compassion, because I cannot imagine that he could ever have had the fortitude or effrontery to give such an exhibition twice.

This is a matter to which the Lantern Society might turn their attention, either by engaging a really competent exhibitor and lecturer to give instruction in elocution, method of delivery, and similar matters, or to lecture on lectures. There are many men who would make good lecturers if they had a little instruction, and had their faults pointed out to them in a kind and considerate manner. "Hold your head up," or "Throw it off your chest, guv'nor"—"Not so much Er-Er, please"—may be emphatic advice, but it is scarcely encouraging to a speaker in public.

Lantern Novelties.—Part II.

By Tom A. Whitehead.

"You're quite sure, sir, there's nothing else," said the obliging and alert assistant at the depot in the ———— Road. "Pity for you to forget anything, considering the distance, and you so seldom come to see us since your removal." "Nothing that I can think of," I replied. "Oh, by the way, sir, did you try our limes. The glass-cased ones I mean, the invention of Mr. J. Hay Taylor, of the Optical Magic Lantern Journal," he broke in again. "Yes," said I, "and the idea's an admirable one. Not only did I try them, but I continue using them, therefore, enclose some more in my parcel." In common with many another lanternist, have I experienced the disappointment of finding myself out of limes when I should have had a goodly supply—by this I mean it is not unusual to find a canister or two, or even more, ripped from end to end, and their contents powdered and useless, caused by atmospheric influences, on carelessly finished tins. So, to many, "The limes in sealed tubes" are a valuable addition to one's outfit, for although they have been dubbed expensive, they are not so to the business man.

It is really surprising how we managed to give our exhibition in the days that are gone. Take the case of carriers alone. There was but one we recognised. A great, clumsy, ugly, wooden frame arrangement, neither shape nor make. How many are there who would trouble to take it home in these days, when a new perfected something is presented for public approbation nearly ever day. It is astonishing how they all find a market, but they evidently do, by the repeated advertisements we read year after year. During the last twelve months it is impossible to say how many new ones have come to light, and for the most part all ingeniously contrived. To enumerate them would mean an unthankful task—for sure it is, some—and perhaps some of the best—would unintentionally be left out. The carrier inventor has but one class of apparatus in his mind's eye, and that is the single lantern. Most of us are fully aware of how much dissolving—in the strict sense—can be done with a single instrument. One might just as well try to look over his left shoulder with his left eye closed. And while it is gratifying to note the pleasing effects of various pieces of mechanism of the class that from time to time come before me, it would be well in many instances that the word *automatic* be substituted for *dissolving*.

Improvements in lanterns for educational uses, perhaps, have received the most attention for some time past. This is a natural consequence, as the scope in that direction is so much the greater.

The requirements of science in its many branches, opens a range for the mechanician's inventive brain, and so long as the former advances, so long will the latter be kept busy.

Vertical attachments are now so perfected that the object on the screen can be shown horizontally, vertically, or at any desirable angle. It matters little what explanatory illustrations are requisite to demonstrate the lecturer's views, he can find no fault with the apparatus at his command to achieve this object. If any argument were required to make this more convincing, one has merely to look at a certain patent science lantern (a description of which appeared in the advertisement pages of this Journal), to see what an automatic attachment is capable of. Slide makers, too, are far from the rear of novelty producers, for nearly every month brings with it a fresh supply, each more interesting than the last. Slides from life models are now the rule, and not the exception as they were a short time back, and so particular are some of the artists in this groove, that if the subject be too awkward, or difficult to pose from the animate, a composite from the inanimate is scarcely less acceptable. Speaking of slides, it will be obvious to many that the lantern will be requisitioned to lend that importance to the photography of "Rontgen notoriety." By all accounts the surgeon will principally benefit by the discoveries. Fancy presenting yourself one morning at the receiving office of the Progress Hospital, to be interrogated thus: "What's the matter with you," asks Mr. Scalpel. "I er—that is—er—ran a needle in my hand—er—two or three days ago, and this morning have suffer'd great pain near the elbow." "Ah!" says Scalpel after an examination; "most interesting case." "I say Pyro," he continued, "take this man to the 'Rontgen Laboratory!' photo the entire left side, at an angle of 65°, and as soon as ready for the lantern, call me in." A diagnosis of the case having been made, and a thorough inspection of the picture as magnified on the screen, by the surgical staff—you are told by the head of affairs to keep very quiet, and come again in a fortnight, that another negative may be made of the troubled part. "I am of opinion," says your questioner, "that no operation will be required. The needle, as you perceive," said he, using his pointer on the screen, "is now passing the scapular arteries, a most satisfactory course; for in a few days I am in hopes to see it come through the calf of your leg," and on your way home, you say—to yourself—"Well that's all right," or "well I'm blowed," or some such ejaculation.

Already I am told a certain well-known firm, not a great distance from the Law Courts, are prepared to supply lanternists with specimen slides of this skeleton photography.

—:o:—

Polarized Light.—No. I.

By J. J. Briginshaw.

The popularity of the optical lantern is an undoubted fact, yet it is not a little singular that the majority of the possessors of this instrument are content to remain in a groove. It may with advantage be borne in mind that the capabilities of the optical lantern for interesting work are by no means exhausted with the projection of photographic transparencies.

One of the most fascinating researches in connection with the lantern is the study of polarized light, and the various phenomena exhibited by its transmission through the commonest transparent objects. Some of the most attractive experiments in the whole domain of physics are possible with this light. The apparatus need not necessarily be elaborate or costly.

All reflected light, except that from metallic surfaces, is more or less polarized. This was first noticed by Malus, a Frenchman, at the commencement of the present century, while examining a piece of spar by the light of the sun reflected from the windows of the Luxembourg Palace.

At a particular angle, called the polarizing angle, polarization will be greatest. This angle varies with every transparent substance in accordance with its refractive index.

Polarization of light may be effected by four methods :— Reflection, refraction, double refraction, and from small scattered particles. Of these, double refraction is the best.

The property of double refraction is observed in a marked manner in Iceland spar, a transparent mineral substance—carbonate of lime. A beam of light falling upon a rhomb of this crystal is split into two by double refraction. Each of these rays will be found to have undergone a remarkable change, differing from common light. The ray or rays thus effected are termed " polarized."

To be of service for the purposes of projection, one of these rays must be got rid of. This was effected by Nicol in the prism that bears his name, and is the most perfect piece of polarizing apparatus we possess. The means he employed was to cut a rhomb of Iceland spar obliquely through its whole length, and cement the two sections together again with Canada balsam. By this means one of the rays becomes totally reflected—the other ray passing direct through the prism.

Various forms of instruments, known as polariscopes, are constructed for the experimental illustration of polarized light. A very simple form consists of a pile of glass plates—spoilt ½-plate negatives will answer capitally—called the polarizer. From this a beam of ordinary light is reflected at the polarizing angle for glass (about 56 degrees). The reflected light is then received on a second pile of glass plates, called the analyser, at a similar angle. The light is then completely polarized, and will be found in condition for experiment.

A very useful and convenient form of polariscope is one by which the light is polarized by reflection from a bundle of glass plates (A), fitted in a tin elbow (B), made to fit on the flange nozzle of the lantern, the opposite end carrying the objective and Nicol's prism (C), see Fig. I.

A good Nicol prism of any size is expensive. Should the cost be an objection, a pile of glass plates mounted and rotated similar to a Nicol will answer very well—or, indeed, very good effects for private exhibition may be obtained with such small prisms as come with the polarizing attachment to the ordinary microscope. The lantern polariscope described above makes an excellent table polariscope by simply covering the flange nozzle end with a piece of ground glass, and turning it towards a lamp or window.

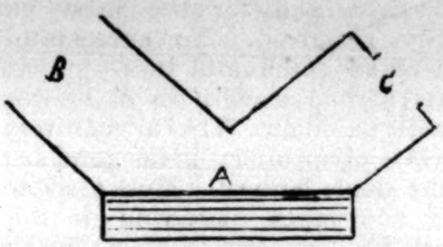

Fig. I.

One of the best substances for the student to commence work with is mica, the same as used for gaslight covers. It is cheap, splits easily, and a variety of really beautiful slides can be produced from it.

Geometrical designs are not by any means difficult to make. Select a thin piece of mica. If this is of uniform thickness throughout it will show one tint with polarized light. With a lead pencil, in a circle of 1¾ inches in diameter, draw a geometrical design—not too complicated to commence with. A six-pointed star makes a good object. Cut out the circle with a pair of scissors. With a sharp pen-knife, just cut the surface of the mica round the design. Insert a fine needle at one of the points of the star, just sufficient to raise a thin layer of the mica. Bring the needle round the edge of the circle, and the layer will become detached. Do this with each section outside the design. If this is carefully done, and each of the detached layers are the same thickness, the star will be surrounded by its complementary colour, when projected on the screen. A variety of beautiful coloured designs can be made by selecting thin films of mica, and superposing them one on another; or by scraping away the mica, variegated patterns can be constructed. These designs, although perfectly transparent when viewed with ordinary light, will, in the polariscope, show gorgeous phenomena.

Designs in selenite are still more handsome, but, being very brittle, require more skill in working. Birds, butterflies, fruits and flowers are some of the designs that may be worked in selenite. The colours, when viewed by polarized light, are beautiful in the extreme, the effect being still further heightened by revolving the Nicol prism while the slide is on the stage.

Crystallisations form another series of splendid objects for projection; they are very easily made, and with a little practice some very fine effects may be produced. Apart from the brilliant results in colour obtained, the preparation of these slides will be found intensely interesting, the character of the crystallisation being influenced not only by the strength of the solution, but also by the temperature at which it is dried. It will be seen at once what a wide field is open for careful experiment. Notes should be kept of the particulars of each preparation, whether the substance was dissolved in water, alcohol, or both; also whether allowed to dry spontaneously or evaporated by heat. The crystallisations may be mounted in a wooden frame, with a dry cover glass placed over them. Deliquescent substances should be mounted in balsam. The list of polarizing salts is a long one; many will be found on the photographer's shelf: Citric, picric, oxalic and tartaric acids, hyposulphite of soda, borax, sugar, starch, most of the nitrates and tartrates, bichromate potash, bichloride mercury, chloride sodium, alum, and iodide of potassium. This does not nearly exhaust the varieties by any means.

(*To be continued*).

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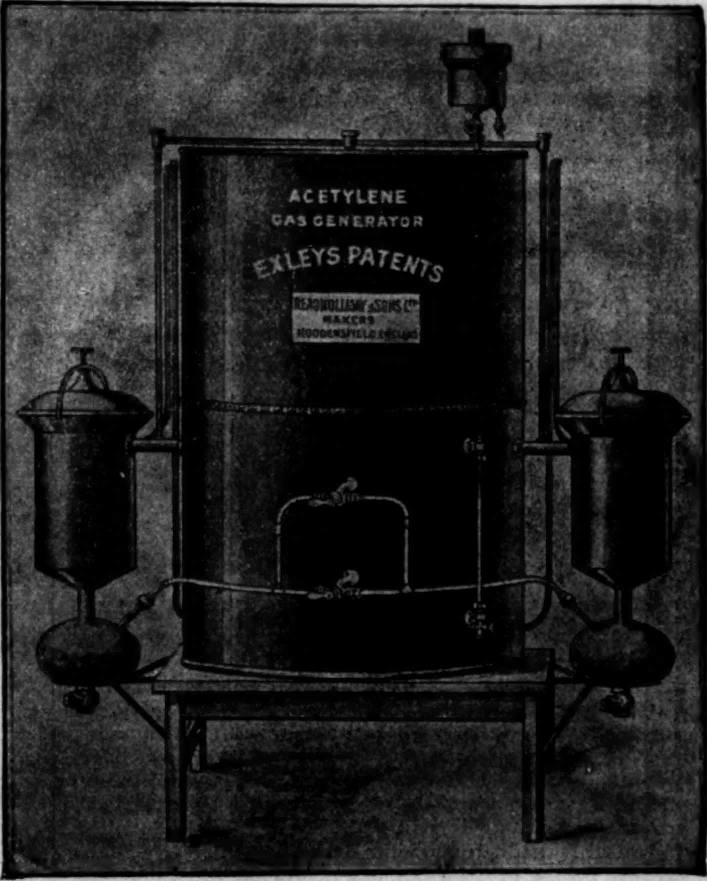
New Apparatus.

ACETYLENE GENERATOR.

Messrs. Read, Holliday, and Sons, of Huddersfield, have in contemplation an acetylene generator and burner specially adapted to the wants of lanternists, and this will be further considered as soon as they have got a sufficient stock of the present form of the generator in hand. The present form is adapted for country houses, churches and public buildings, and so far, is made in one size only, but of course other sizes will follow. We append an illustration of the form they are now making. It is said that there is nothing to get out of order, and that it can be recharged in less time than an ordinary paraffin lamp can be filled and trimmed. This generator, the capacity of which is 12 burners, each of 50 candle-power, generates from one charge 250 feet of acetylene gas, each pound of calcium carbide giving off five feet of gas as required, and the machine in question is constructed to decompose 50 lbs. of carbide (25 lbs. in each generator), and yields about 250 feet of acetylene, this being equivalent to 3,750 feet of coal gas. The illuminating power of acetylene is 240 candle, and coal gas 16 candle, thus acetylene is about fifteen times the illuminating power of coal gas, consequently much less gas is required. Ordinary coal gas burners consume five feet per hour; but for acetylene, burners are made to use one foot per hour, giving an illumination of 50 candles. This apparatus measures—holder, 2 feet 6 inches by 4 feet 3 inches; generator, 10 inches by 18 inches.



STEDMAN'S AUTOMATIC OXYGEN GENERATING APPARATUS.

Lanternists have, we learn, been set on the *qui vive* by reason of an advertisement which appeared in our last issue in a frame, stating that a startling announcement was to appear therein in next issue of this journal, and many are the letters which we have received from those apparently too impatient to wait. Their curiosity will now be satisfied when we announce that this had reference to the above, and we must compliment Mr. Stedman on his ingenious method of commencing his series of advertisements. We have recently been present during an exhibition at which his new patent automatic generating apparatus was used, and are pleased to say the whole thing from the time of three minutes after setting up worked steadily for upwards of hour and a half without requiring any attention whatever, and as far as attention was concerned, the apparatus might have been situated in an attic and the lantern used in a parlour. To see the automatic changing appliance at work showed the result of the master mind of the inventor, for in such a simple manner has he achieved the results stated. At the end of about an hour and a half a recharge is necessary, and this can be done in a minute or two, but does not necessitate the light going out at the lantern, when the apparatus is again ready for generating. There is an ingenious arrangement whereby the pressure is regulated. The apparatus measures externally 28 in. by 19 in. by 7 in., and is very portable; and in this space is included a tank whereby the gas is cleansed before being used.

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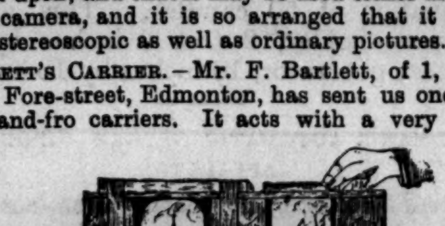
Editorial Table.

Thornton - Pickard Manufacturing Company's Works.—A handsome folio containing mechanical reproductions from photographs, showing the inside of the workshops, etc., of this company, has been received. These views, which are 6 by 8 inches, show the outside of the factory, wood-working machinery, cabinet makers, metal-working machinery, brass finishing, shutter fitting, finishing and examining room, and the general office; and are of great interest. They are well executed, and are sure to be kept by those who obtain a copy. At the end of this book, on one modest page, are given the various prices of the Thornton-Pickard shutters and cameras. From the catalogue which came with this book, we observe that their "Ruby" camera has been improved upon, and that it may be used either as a hand or stand camera, and it is so arranged that it can be used for stereoscopic as well as ordinary pictures.

Bartlett's Carrier.—Mr. F. Bartlett, of 1, Euston Cottage, Fore-street, Edmonton, has sent us one of his new to-and-fro carriers. It acts with a very smooth motion, and is fitted with a rising platform, so that (as shown in illustration) a slide can be removed without becoming finger-marked.



"A Visit to the Shetland Isles" is the title of a new set of slides with reading, which has been brought out by Mr. R. H. Ramsay, of Lerwick. The set consists of fifty-four slides, and as Mr. Ramsay is a professional photographer and a native of Shetland, he possesses great advantages, by way of selection of points of interest, over anyone who may casually visit these parts with the intention of making a series of photographs. The entire set and lecture are of great interest, and afford much instruction.

Lumiere's Platino-Matt Bromide Paper.—From the sole importers (Messrs. Fuerst Bros., 17, Philpot-lane, E.C.) we have received samples of this paper. It is manufactured in two rapidities:—(a) for contact printing and (b) for enlarging. The rapidity of the (b) is about four times that of (a). With this paper, a good negative, and correct exposure, the results are very brilliant, yet with a matt surface. The makers recommend the following developer, which should be prepared at the time required:—Water, 10 ounces; sulphite of sodium-anhyd., 100 grains; amidol, 25 grains; 2 per cent. sol. brom. potm., 50 drops. For fixing, the following is recommended (keeps indefinitely):—Water, 10 ounces; hypo., 2 ounces; bisulphite of sodium-liquid, 50 drops; alum, 10 grains.

Sets of Slides by J. Pattison Gibson, Hexham.—From Mr. Gibson we have received about a dozen miscellaneous slides, being selections from about fifty sets he has just introduced. The subjects are very comprehensive, and include various styles of architecture, castles, Roman wall, river scenes, abbeys, herring fishery, prehistoric Britain, Farne Islands, north country cottages, and many others. The slides are of a pleasing, warm tint, and are particularly full in detail, the gradations of light and shade being excellent, showing that the photographing of each was made a special study as to the time of day at which they were taken.

"The New Light," published by Messrs. Dawbarn & Ward, Ltd., contains good matter and fine illustrations, and has met with a large sale.—Price 3d.

"Shadowgrams."—Messrs. G. W. Wilson & Co., Aberdeen, are issuing slides showing a needle embedded in a girl's foot for 1s. each.

Stereoscopic Projections.—From Dr. Demole, Geneva, we have received some of his new Slides for stereoscopic projection with a single lantern. These consist of two stained transparencies bound together (one red and the other green), so that the vertical lines are separated a little. Coloured spectacles are used to view them on the screen.

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Patent Intelligence.

The following list, relating to current Patent Applications, is compiled expressly for "The Optical Magic Lantern Journal" by a registered Patent Agent. For further information apply to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

No. Recent Patent Applications.

1142. 16th January, 1896. Bert Acres. An improvement in optical lanterns.

1300. 18th January, 1896. C. Polony. A process and furnace, installation for continuous process of production of a non-exploding mechanical mixture of oxygen and hydrogen.

2171. 30th January, 1896. J. Lewis. Improvements in gas and other such-like cylinders, and in the mode and means for keeping such cylinders from becoming unduly hot.

2671. 5th February, 1896. W. C. Pexton. Improvements in and relating to magic lantern slides.

2820. 7th February, 1896. S. H. Cousins. Improvement in connection with magic lanterns and the like.

RECENTLY-PRINTED SPECIFICATIONS.

Copies of the following specifications may be obtained by remitting 1/- for each specification to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

2118 of 1895. Moessard. Viewing stereoscopic pictures by projection.

2305 of 1895. Ives. Photo-chromoscopes, etc.

3784 of 1895. Photo-chromoscopes.

4807 of 1895. Cloquet. Producing illusions and scenic effects.

12245 of 1895. Sweetser. Oxygen gas.

13331 of 1895. Farnam. Kinetescope.

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Correspondence.

MACHINE CONSTRUCTION TAUGHT BY THE LANTERN.

To the Editor.

DEAR SIR,—I have read through the article by "Progress" on this subject, and agree with him that pinning diagrams on the walls of the lecture-room has certain disadvantages, but I would like to point out that it has been the custom for several years in the leading colleges and technical schools of the north, as well as at Finsbury, University College, etc., in London, to make use of the lantern for showing machine details.

The Yorkshire College Engineering Department had a most complete system quite six years ago. The arrangements included an apparatus for photographing from a large or small book, or large sheet of drawing paper; a screen which when not in use could by the simple operation of pulling a cord be packed away in a dust-proof cupboard in the wall, a revolving lantern slide holder to stand near the lecture table, and capable of carrying some three or four hundred slides, etc., etc.

With reference to making cheap slides, a good method is to have pieces of ground glass 3¼ inches square finely ground on one side only. The drawing is made in dense Indian ink with ruling pen and compasses, in just the same way as one would make a tracing. When the ink is quite dry the slide is placed on a spindle which can be rotated very rapidly, and it is fixed with the ground side upwards. A drop of Mander's Coburg transparent varnish is then placed at the centre, and on the spindle being rotated it spreads over the whole surface in a beautifully even layer, and without any bubbles or specks. When the varnish is dry the slide is ready for use right away.

Yours faithfully,
ERNEST SCOTT.

21, Lichfield-street,
Wolverhampton.

HITCHES—WORSE.

To the Editor.

SIR,—Unsuccessful lantern lectures are as often caused by the lecturer as by the lanternist. It often happens that a good show is rendered perfectly wearisome by the incapacity of the lecturer. Many a speaker, perfectly at home before an audience within a brilliantly lit hall, is quite out of it in a lantern lecture. The sensation of addressing people whom he does not see is so new and strange to him that he loses his head. We have seen many instances of this. The other night a gentleman gave a lecture in a church, which he entitled "Peeps at Nature," and although the lantern was manipulated by a professional, yet the lecture proved very tame and ineffective. The gentleman spoke in a low voice, so that he was not well heard, and although he tried to brighten up his remarks by a few stale jokes, yet the people at the back were talking and evidently uninterested. He had several times to stop and appeal most pathetically for silence, as he could not think if there was the least noise.

Another case occurred the other day, when a popular clergyman gave a lecture to children where the lantern was also managed by a professional and the slides were splendid, but the entertainment was far from being a suitable one. The subject of the lecture was "Egypt," but the children soon got tired of the names of places and dimensions of buildings, and heights of monuments. Some persons complimented the children for being so quiet, but that was not to be wondered at, seeing that many of them were asleep.

The hitches are not always at the lantern end of the hall. Lecturers have often a good deal to answer for in the matter of hitches.

Another country minister procured a box of Norwegian slides to illustrate his lecture on Norway, but as he read a paper for one hour and a half before the slides were called for, very few of them were seen to advantage, as it was too late by the time the gentleman had finished speaking.

These are instances of how lecturers may spoil what otherwise might prove a first-rate exhibition. There are one or two things that might be mentioned as necessary for a good lantern lecture. First, the slides should be, if possible, of an equal quality, for a poor slide coming on after an artistic one provokes criticism. Second, the same duration of remarks should be made upon each slide, as when too long time is spent on one slide others have to be hurried through. This can be managed quite well in most lectures with a little consideration. Third, the lecturer should occasionally come in front of the screen and point out some detail in the picture. There is more interest in the audience when they see the person who is speaking. There is no doubt that a read lecture is far less effective than one delivered without a paper. Perhaps the best lantern lecturers ever before the public in this country were Harry Furniss, who lectured on his parliamentary experience, and Dr. Harry Guiness, who gave an account of his missionary tours in Africa. These are two ideal lantern lecturers.

Yours, etc.,
C. W. SHEPHERD.

Dundee.

STOCK'S OIL LAMP.

To the Editor.

SIR,—I have read an article in the February issue of your highly interesting paper on oil lights, by Mr. W. J. Coles. His knowledge of optical oil lamps to me (and probably also to others who are continually experimenting with oil lamps), is very amusing. I state without any hesitation whatever, that it is impossible (using the same oil and wick) to make a 3-wick lamp project as much light as a 4-wick lamp on the screen, through the usual lantern lenses, providing wicks are the same width and both lamps are constructed to burn with perfect combustion. Although my patent lamps are made with great care by skilled workmen, some lamps give better light than others, so that it is sometimes possible to find a 3-wick equal the light of a 4-wick lamp. A very little alteration to a lamp, which sometimes takes several hours to find out (and very few people know how to make the proper adjustment), makes a wonderful difference in the light. I have experimented with various forms of lamps 2, 3, 4 and 5 flat wick, oblong wick, central draught round wick, central draught flat wick and the W form of wick, but up to the present time I have not been able to produce such good results as with my present form, which has four flat wicks each barely 2 inches wide. I have quite a collection of reflectors of different curvature, and I find the kind I use to be most satisfactory.

Yours truly,
W. STOCKS.

Rye, Sussex.

A CONE OF PLATINUM BLACK.

To the Editor.

DEAR SIR,—A "Lanternist" in November last issue described a patent fuse for lighting gas without a match. It was composed of platinum wire and a cone of platinum black. In buying the platinum cone I have got this in grain form. Can anyone tell me how to make it into a cone? and oblige

Yours truly,
A. GILLESPIE, JUN.

12th February, 1896.

* * *

Notes and Queries.

Geo. Betteridge.—We do not publish any book on the subject named.

Kingsbury.—(1) Does compressed coal-gas, when kept in cylinders, seriously deteriorate? Does the discolouration of the lime mean any great loss of light? (2) I have heard, from an expert, that this gas also diminishes in quantity, though the valve may be sound. Can this be so? (3) Is there any reliable means of getting rid of the difficulty caused by condensation of moisture on slides? Placing them near a fire before hand is not sufficient. *Ans.*—(1) Yes, in many cases. The discolouration means great loss of light. (2) We have never known this to be the case, except from leakage. (3) Unless the slide and mat are free from moisture at the time of binding, there will always be a trouble on this score.

J.T.—One cannot be too careful in procuring the very best oil; a good kerosene is the best to use. Cheaper oils will in a short time after being lighted up cause the wick to char, and then further turning up only makes the matter worse, and although one may for a time get a large flame there will be little light from it.

E. Lloyd.—With two lanterns side by side the use of an incandescent gas burner is a simple matter, but for use with an ordinary bi-unial you would require to use the burner in the lower lantern without the chimney, and also cut a hole at one side of the division between the upper and lower lanterns.

J. K. O.—The lantern you speak of should be a good one, and after all for general purposes the form of condenser you have is as well suited as any for ordinary work. We should be inclined to ask you to see to the jets, and make sure that they are quite clean in the inside; the difference in light given by a clean and dirty jet is very great.

Photophil writes: I should be glad to know how to make oxygen from chloride of lime without employing chlorate of potash. *Ans.*—Procure three vessels (say large mouthed bottles), each fitted with a cork, into each of which have been bored two holes. Into bottle No. 1 fit a thistle top tube with a crook, and also a bent piece of tube. Into No. 2 fit two tubes, so that the one reaches near the bottom, and the other merely comes through the cork. Bottle No. 3 should be fitted in the same way. These are connected, so that the short tubes and the long tubes are as one. Into bottle No. 1 place manganese dioxide, and into the thistle top tube pour some hydrochloric acid. This will give off chlorine gas, which will pass down the long tube into bottle No. 2, which should contain a creamy solution of bleaching powder (chloride of lime), to which has been added chloride of cobalt. The chloride, after bubbling up through this, comes out as oxygen, and is passed on to the third bottle containing water, which will act as a wash bottle. The oxygen can from that be stored into a bag. After a time the action will cease, but by the application of a Bunsen burner under bottles 1 and 2 this will be augmented. The chloride of cobalt will in time be precipitated in bottle No. 2, and thus used over and over again. The process, however, is a dirty and messy one.

J.O.H.—Yes, it will do if you only want a small-sized disc.

A. E. Bingemann.—Many slides are painted by ordinary oil-light, but the incandescent gas is much better; but with certain colours it will be extremely difficult to get the correct intensity. Try gamboge and Italian pink.

Hugh B. Cooper.—Particulars have not appeared in this journal, but if you send a question dealing with the part that is troublesome to you, we will supply particulars.

H.S.—With a 4-in. focus lens the lantern will require to be about 11 ft. from the screen to give an 8 ft. disc. To give the same size disc with a 6-in. focus, it must be about 16 ft. off, whereas with an 8 in. focus about 21 ft. The source of light has nothing to do with it. If you get one of our Ready Reference Table, post free 2½d., you will be able to ascertain the distances for any focus of lens.

Many interesting Articles have been crowded out of this issue.

Messrs. SOPER & STEDMAN, 147, Strand, *write*:

23rd January, 1896.

DEAR SIR,—We feel it our duty to write and tell you that we are more than pleased with the result of our **ADVERTISEMENT** which has been inserted in your **"OPTICAL MAGIC LANTERN JOURNAL"** for the past **TWELVE MONTHS.** We are sure you will be gratified when we tell you we have had **ORDERS** and enquiries for slides from **INDIA, SOUTH AUSTRALIA, MAURITIUS, ZAANDAM, GERMANY,** and from **ALL PARTS** of **ENGLAND, SCOTLAND** and **IRELAND.** We can only attribute these orders coming in through our advertisement in your **LANTERN JOURNAL,** which plainly shows to us that the journal in question must have a **VERY LARGE CIRCULATION ABROAD.**